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custrines formed their cutting instruments). This hatchet is sixteen centimetres long by seven broad, and is by far the largest yet discovered in any part of Switzerland, no other collection having any measuring more than eight centimetres in length. A quantity of the bones found at the same time have been sent to Dr. Uhlmann, of Münchenbuchsee, for examination by him, and he finds that they belong to the following animals, viz:—stag, horse, ox, wild boar, pig, goat, beaver, dog, mouse, etc., together with a number of human bones. If the level of the lake continues to sink, it is hoped that further discoveries will be made, and the scientific world here is waiting the result of the engineering operations with keen interest.” — *The Standard*. — *Nature*.

MICROSCOPY.

THE MICROSCOPE IN THE LECTURE ROOM.—Dr. N. J. C. Müller of Heidelberg sends a notice to the “Botanische Zeitung” of his experience in the use of the microscope in his botanical lectures, that deserves the attention of those who desire the help of the microscope in illustrating scientific lectures. The objections to the plan of bringing in a number of instruments under each of which a preparation has been placed, are many and serious. The most important is perhaps the difficulty which one unaccustomed to the use of the microscope has in understanding the new and strange appearances presented, and that while looking at the prominent objects in sight, such as air bubbles and foreign bodies of marked and strong outline, he misses altogether the real object which ought to have been seen. The experiment of using the ordinary microscope as a solar microscope and presenting the image of the object on a screen where it could be seen by the whole class at once, and their attention directed to the important points, was tried last summer, and with the most marked success. He used one of Hartnack’s first class instruments clamped in a horizontal position and received the image on a screen distant from five to eight metres making an image of two to three metres in diameter. An heliostat and one or two condensing lenses directed the light on the object. The microscope was so placed that the stage was somewhat this side of the focus of the collecting lens. When images were desired as free as possible from spherical aberration the ocular was removed and the image taken directly

from the objective ; when on the other hand the greatest possible amplification was desired, then both objective and ocular were used. In this way by the use of Hartnack's immersion lenses the finest test objects were exhibited, and the six sided spaces of the Pleurosigma shown as four to five millimetres in diameter. For such times as sunlight is not available he recommends the Drummond light, and promises to give the results of his experience in its use.

In place of the expensive heliostat, no doubt the simple arrangement often used by lecturers on Natural Philosophy might be adopted. It consists of a mirror outside the window movable in two directions by means of screws whose heads come within the room.—T. D. B.

ANGULAR APERTURE.—Dr. Pigott revives the subject of diaphragms behind the objective, and reports some very remarkable results somewhat similar, of course, to those resulting from the use of an achromatic condenser of very small angular aperture. He does not demonstrate the advantages of using a diaphragm over the objective as compared with the other and more usual method.

PREPARATION AND PRESERVATION OF TISSUES.—Dr. J. J. Woodward commences, in “The Lens,” a summary of the various methods employed for this purpose. He prefers to harden the tissue by gradual dehydration by means of alcohol, and to cut it (imbedded if small, in paraffine) either off-hand or in a common section machine. By the latter means sections less than one-two-hundredth of an inch thick are easily obtained. He covers the top of the section machine with a glass plate suitably perforated and cemented fast by means of marine glue ; and advises that the alcohol used to dehydrate the specimens be saved and filtered for the preservation of large anatomical specimens.

Dr. I. N. Danforth gives, in the same Journal, his methods of preparation, the main object of which is simplification of the usual procedures. He makes the pithy assertion that success depends more upon tact than upon tools. He cuts the sections from perfectly fresh tissues, by means of a thin, single-bladed knife ; invariably stains them, preferring for this purpose Beale's carmine solution ; washes them in diluted and acidulated glycerine ; and preserves them in slightly acidulated glycerine. He very

properly denounces the slovenly custom of carrying home fresh specimens of tissues, etc., wrapped in a rag or newspaper. The policy of cutting fresh tissues frozen, which is coming into use here and abroad, seems to have escaped his notice, as it is neither adopted nor condemned and is too important an innovation to be ignored.

ABSORPTION OF SOLID PARTICLES.—“The Lancet” reviews this interesting and timely subject. Oesterlen, nearly thirty years ago, found molecules of mercury in the blood of cats, absorbed from the stomach; and he, Eberhard, Landerer, and especially Voit, rubbed the same material into the skin of cats and dogs and found it in the liver, spleen, and other internal organs. The experiments of Herbst and Bruch seemed to demonstrate the absorption into the bloodvessels of milk-globules and starch-granules; Marfels and Moleschott fed frogs on blood-corpuscles and pigment-corpuscles of sheep, and saw these corpuscles circulating in the web of the frog’s foot; while Donders and Mensonides found charcoal in the blood of rabbits with whose food it had been mixed. Thus the absorption of solid particles through uninjured membranes has become nearly certain notwithstanding the negative results obtained by Bärensprung, Recklinghausen, and a few other experimenters. M. Heinrich Auspitz has recently continued these researches by means of rice-starch the granules of which, easily used on account of their small specific weight, and easily recognized by their form and by the iodine color-test, vary from about the size of the red corpuscles of the animal used (the rabbit) to about twenty times as large. Starch injected into the veins, he detected in all the organs of the body; and starch suspended in water or still better in oil, was injected into the serous cavities and into the subcutaneous cellular tissue, and subsequently recognized in the circulation.

MULTIPLYING SPECIES.—In describing a new variety of Lepidodendron stem, before the Royal Microscopical Society, Mr. W. Caruthers, F.R.S., states that it would be in accordance with usage to give a specific name to the new fragment. He refrains, however, for want of sufficient data, and gives the following racy illustration of the method of those investigators who set aside the work of previous workers and recklessly give new names to fragmentary specimens. “Suppose, for instance, it were discovered that we had in this country another *Papilio* beside the Swallow-tail, and

that one entomologist got hold of a hind wing and found that it had two tails, and so full of his important discovery he figures and describes his fragment as *P. bicaudatus* Mihi; another finds a head with the antennæ attached, and these are obviously more club-shaped than the known species, and of course it is *P. clavatus* Mihi; the body falls into the hands of a third, and it is thick and short and blunt, and easily distinguished from *Machaon*, so it becomes *P. truncatus* Mihi; the fore wing turns up, and it has got blue lines and spots and it would be absurd not to give this new species a name, and it is *P. caeruleus* Mihi; but the body is investigated by an entomologist with an anatomical bias, and he makes some important observations deserving to be published; and the subject must have a name, so it becomes *P. intestinalis* Mihi; and to terminate an illustration which might be carried to any extent, the caterpillar is found in a field of carrots; a discovery so important must be published at once, and it is *P. carotæ* Mihi. The absurdity of such proceedings is apparent from such an illustration as this, but in fossil botany the terrible reality has to be encountered, and not only roots, stems, branches, leaves and fruit get different names, but different states of the same stem receive different generic and specific names."

DEVELOPMENT OF VEGETABLE AND ANIMAL LIFE.—Dr. T. C. Hilgard sums up his peculiar views on this subject in a recent lecture before the New Orleans Academy of Sciences. He recognizes no such classes as Protophyta and Protozoa; but states that "all the so-called infusoria, all the *protozoa*, *protophyta* and fresh water algae, so called, are severally and collectively in all known cases, the immature but even thus self multiplying germs of higher (or adult) forms of plants and animals, otherwise well known for themselves." Some of the observations leading to these conclusions have been already published, and others are promised in the Proc. A. A. A. S. for 1871. Somewhat similar views were published by Metcalf Johnson, in the Monthly Microscopical Journal. Though not at present received by scientific men, to any extent, these theories must be admitted to be not only ingenious, but suggestive of further investigation.

THE LEUCOCYTES.—Prof. Hoppe-Seyler's recent investigations of the white corpuscles of blood, lymph and pus, give somewhat novel and very interesting results. Their original identity is admitted,

but a manifest and permanent differentiation is claimed to occur. By an ingenious experiment, glycogen was detected in lymph-cells. Their glycogenic properties are lost when lymph or white blood-corpuses become transformed into non-contractile pus-corpuses, which latter, by excess of oxygen, may undergo fatty degeneration, or, by long immersion in water, other changes due to the presence of oxygen. There also seems to be a close chemical relationship between pus-corpuses and yeast-cells.

EXOGENS AND ENDOGENS.—At a recent meeting of the Royal Microscopical Society, Prof. T. Dyer expressed himself satisfied of an exogenous growth in *Lepidodendron*, notwithstanding its evidently cryptogamic character. He considered De Candolle's terms exogens and endogens to be already generally abandoned in favor of John Ray's previous names Dicotyledons and Monocotyledons. Recent researches, especially those of Mohl, had proved that Monocotyledons were really not endogenous, but acrogenous; and some cryptogams, as lichens and algæ, as well as Monocotyledons, are regularly exogenous. The speaker regretted that the study of palæontology was so much separated from that of recent organisms. He would like to see fossil and recent specimens not only studied by the same systematists, but arranged side by side in the museums.

A CONSPECTUS OF THE DIATOMACEÆ.—This mature and very valuable work by Prof. H. L. Smith, has begun to appear in "The Lens." Diatomists will look with interest for the succeeding numbers.

PHOTO-MICROGRAPHS POPULARIZED.—It is to be hoped that microscopists, and others interested in scientific progress, will notice and appreciate the effort now being made, by Mr. C. Meinerth of Newburyport, Mass., to supply "in a cheap and convenient form" really good photographic representations of microscopic objects. Judging from the work already done, Mr. Meinerth's enterprise will prove both entertaining and instructive to the cultivated public.

NOTES.

SAN FRANCISCO Meeting of the American Association for the Advancement of Science. In our last number we announced that the committee having the matter in charge had decided that the